

Dentistry (English)			
Bachelor	TR-NQF-HE: Level 6	QF-EHEA: First Cycle	EQF-LLL: Level 6

## Course Introduction and Application Information

Course Code:	UNI320		
Course Name:	Health & Microbiome		
Semester:	Spring		
Course Credits:	<div>ECTS</div> <div>5</div>		
Language of instruction:	English		
Course Condition:			
Does the Course Require Work Experience?:	No		
Type of course:	University Elective		
Course Level:	<div>Bachelor</div> <div>TR-NQF-HE:6. Master`s Degree</div> <div>QF-EHEA:First Cycle</div> <div>EQF-LLL:6. Master`s Degree</div>		
Mode of Delivery:	E-Learning		
Course Coordinator:	Dr. Öğr. Üy. DENİZ SERTEL ŞELALE		
Course Lecturer(s):	İbrahim Çağatay Acuner, Pınar Yurdakul Mesutoğlu, Deniz Sertel Şelale, Ayhan Mehmetoğlu		
Course Assistants:			

## Course Objective and Content

Course Objectives:	<p>The aim of this course is to convey information on;</p> <ul style="list-style-type: none"> <li>- fundamentals of human microbiota &amp; microbiome</li> <li>- formation and development of microbiota</li> <li>- factors that affect the composition of microbiota</li> <li>- effects of microbiota on human health</li> </ul>
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	<ul style="list-style-type: none"> <li>- association of microbiota with diseases</li> <li>- pharmaceutical modulation of microbiota</li> </ul>
Course Content:	This course includes theoretical lectures regarding human microbiota and its effects on human health and association with diseases.

## Learning Outcomes

The students who have succeeded in this course;

- 1) Should be able to define microbiota, microbiome and metagenome concepts.
- 2) Should be able to describe human microbiota and explain how it's formed.
- 3) Should be able to explain the factors that affect the composition of microbiota.
- 4) Should be able to define the effects of microbiota on human health.
- 5) Should be able to explain the association of microbiota with diseases.
- 6) Should be able to discuss the use of pharmaceutical preparations that modulate microbiota in promotion of health.

## Course Flow Plan

Week	Subject	Related Preparation
1)	Introduction to microbiota, microbiome and metagenome concepts	Review of the course materials
2)	Transmission and development of microbiota	Review of the course materials
3)	Nutritional modulation of the gut microbiome	Review of the course materials
4)	Microbiota perturbations: Dysbiosis and Disease	Review of the course materials
5)	Microbiota & Obesity; Type-2 Diabetes and Cancer	Review of the course materials
6)	Gut microbiome and host immunity	Review of the course materials
7)	Microbiota & Gut-Brain / Gut-Lung Axis	Review of the course materials
8)	Mid term exam	Review of the course materials
9)	Consumption of antibiotics and microbiota	Review of the course materials

10)	Fecal transplantation	Review of the course materials
11)	Nutritional modulation of the gut microbiome for metabolic health and healthy longevity	Review of the course materials
12)	Prebiotics, probiotics and next generation pharmaceutical modulation of the gut microbiome	Review of the course materials
13)	One health approach, and microbiota	Review of the course materials
14)	Multi omics approach and future trends	Review of the course materials
15)	Final Exam	Review of the course materials

## Sources

Course Notes / Textbooks:	Tungland B. Human Microbiota in Health and Disease. Academic Press;2018. ISBN 9780128146491
References:	<ul style="list-style-type: none"> <li>• Cryan JF, Dinan TG. Mind-altering microorganisms: the impact of the gut microbiota on brain and behaviour. <i>Nat Rev Neurosci</i>. 2012 Oct;13(10):701-12. doi: 10.1038/nrn3346. Epub 2012 Sep 12. PMID: 22968153.</li> <li>• Sonnenburg JL, Bäckhed F. Diet-microbiota interactions as moderators of human metabolism. <i>Nature</i>. 2016 Jul 7;535(7610):56-64. doi: 10.1038/nature18846. PMID: 27383980; PMCID: PMC5991619.</li> <li>• Carabotti M, Scirocco A, Maselli MA, Severi C. The gut-brain axis: interactions between enteric microbiota, central and enteric nervous systems. <i>Ann Gastroenterol</i>. 2015 Apr-Jun;28(2):203-209. PMID: 25830558; PMCID: PMC4367209.</li> <li>• Kim S, Covington A, Pamer EG. The intestinal microbiota: Antibiotics, colonization resistance, and enteric pathogens. <i>Immunol Rev</i>. 2017 Sep;279(1):90-105. doi: 10.1111/imr.12563. PMID: 28856737; PMCID: PMC6026851.</li> <li>• Sonnenburg JL, Sonnenburg ED. Vulnerability of the industrialized microbiota. <i>Science</i>. 2019 Oct 25;366(6464):eaaw9255. doi: 10.1126/science.aaw9255. PMID: 31649168.</li> <li>• Mikroorganizmalar ve insan vücudu ile olan etkileşimleri Microorganisms and their interaction with human body. Rıdvan Çetin et al. DOI: 10.5455/pmb.1-1422383762</li> <li>• Tang ZZ, Chen G, Hong Q, Huang S, Smith HM, Shah RD, Scholz M, Ferguson JF. Multi-Omic Analysis of the Microbiome and Metabolome in Healthy Subjects Reveals Microbiome-Dependent Relationships Between Diet and Metabolites. <i>Front Genet</i>. 2019 May 17;10:454. doi: 10.3389/fgene.2019.00454. PMID: 31164901; PMCID: PMC6534069.</li> </ul>

- İntestinal mikrobiyota ve obezite ilişkisi, The relationship between intestinal microbiota and obesity. Tuba tekin et al. Derleme 2018; 27: 95-99.
- Ichim TE, Patel AN, Shafer KA. Experimental support for the effects of a probiotic/digestive enzyme supplement on serum cholesterol concentrations and the intestinal microbiome. J Transl Med. 2016 Jun 22;14(1):184. doi: 10.1186/s12967-016-0945-2. PMID: 27333764; PMCID: PMC4918082.
- Kuugbee ED, Shang X, Gamallat Y, Bamba D, Awadasseid A, Suliman MA, Zang S, Ma Y, Chiwala G, Xin Y, Shang D. Structural Change in Microbiota by a Probiotic Cocktail Enhances the Gut Barrier and Reduces Cancer via TLR2 Signaling in a Rat Model of Colon Cancer. Dig Dis Sci. 2016 Oct;61(10):2908-2920. doi: 10.1007/s10620-016-4238-7. Epub 2016 Jul 6. PMID: 27384052.
- Salvucci E. The human-microbiome superorganism and its modulation to restore health. Int J Food Sci Nutr. 2019 Nov;70(7):781-795. doi: 10.1080/09637486.2019.1580682. Epub 2019 Mar 7. PMID: 30843443.

## Course - Program Learning Outcome Relationship

Course Learning Outcomes	1	2	3	4	5	6
Program Outcomes						
1) Has basic and up-to-date knowledge in the field of dentistry, follows scientific publications, and applies evidence-based data to his/her professional practice.						
2) Knows well and effectively uses devices, tools, and materials specific to diagnosis and treatment in the field of dentistry.						
3) Evaluates the knowledge in the field of dentistry critically, integrates it with the knowledge of disciplines in the field of health, uses it by analyzing and synthesizing it.						
4) Produces projects related to the field of dentistry, can work with other health disciplines, takes part as a member of the research team and evaluates and reports the results obtained at a scientific level.						
5) Uses information that will contribute to the dentistry profession during practice, takes responsibility, and produces solutions in unforeseen situations.						
6) Shares, compares, and exchanges dental knowledge with professional colleagues in social and scientific environments in written, verbal, and visual forms.						
7) Within the framework of social, scientific, and ethical values including patient privacy, communicates with patients and their relatives, knows all the						

characteristics of the patient, and recommends the most appropriate treatment with a patient-centered approach.	1	2	3	4	5	6
<b>Course Learning Outcomes</b>						
8) Follows technological developments, participates in national and international studies, and shares and presents own observations, experiences, and research to further advance dental practices.						
9) By adopting the principle of lifelong learning throughout the dentistry profession, follows current evidence-based dental knowledge and uses it during his professional practice.						
10) During dental practice, in cases such as abuse and addiction, performs the treatment by exhibiting the behaviors required by social ethics and legal rules, and collects and records the relevant data.						
11) Uses basic and current knowledge in the field of dentistry during professional practice for the benefit of society within the framework of national values and country realities.						
12) In natural disasters and emergency cases, takes the protective measures required by the dentistry profession; performs professional practices that benefit patients and society						
13) Generates ideas regarding health policy in dentistry, prioritizes individual and public health, and carries out preventive and therapeutic medical practices within the framework of scientific, ethical, and quality processes.						
14) Differentiates the signs and symptoms commonly encountered in the dentistry profession, makes a treatment plan and refers when necessary, and manages diseases and clinical situations regarding their urgency and patient priority.						
15) Can assume the leadership responsibility of the team he/she works for, manage it following scientific criteria, and support the professional development of the team.						

### Course - Learning Outcome Relationship

No Effect	1 Lowest	2 Average	3 Highest

	Program Outcomes	Level of Contribution
1)	Has basic and up-to-date knowledge in the field of dentistry, follows scientific publications, and applies evidence-based data to his/her professional practice.	

2)	Knows well and effectively uses devices, tools, and materials specific to diagnosis and treatment in the field of dentistry.	
3)	Evaluates the knowledge in the field of dentistry critically, integrates it with the knowledge of disciplines in the field of health, uses it by analyzing and synthesizing it.	
4)	Produces projects related to the field of dentistry, can work with other health disciplines, takes part as a member of the research team and evaluates and reports the results obtained at a scientific level.	
5)	Uses information that will contribute to the dentistry profession during practice, takes responsibility, and produces solutions in unforeseen situations.	
6)	Shares, compares, and exchanges dental knowledge with professional colleagues in social and scientific environments in written, verbal, and visual forms.	
7)	Within the framework of social, scientific, and ethical values including patient privacy, communicates with patients and their relatives, knows all the characteristics of the patient, and recommends the most appropriate treatment with a patient-centered approach.	
8)	Follows technological developments, participates in national and international studies, and shares and presents own observations, experiences, and research to further advance dental practices.	
9)	By adopting the principle of lifelong learning throughout the dentistry profession, follows current evidence-based dental knowledge and uses it during his professional practice.	
10)	During dental practice, in cases such as abuse and addiction, performs the treatment by exhibiting the behaviors required by social ethics and legal rules, and collects and records the relevant data.	
11)	Uses basic and current knowledge in the field of dentistry during professional practice for the benefit of society within the framework of national values and country realities.	
12)	In natural disasters and emergency cases, takes the protective measures required by the dentistry profession; performs professional practices that benefit patients and society	
13)	Generates ideas regarding health policy in dentistry, prioritizes individual and public health, and carries out preventive and therapeutic medical practices within the framework of scientific, ethical, and quality processes.	
14)	Differentiates the signs and symptoms commonly encountered in the dentistry profession, makes a treatment plan and refers when necessary, and manages diseases and clinical situations regarding their urgency and patient priority.	
15)	Can assume the leadership responsibility of the team he/she works for, manage it following scientific criteria, and support the professional development of the team.	

## Assessment & Grading

Semester Requirements	Number of Activities	Level of Contribution
Homework Assignments	1	% 20
Midterms	1	% 20
Final	1	% 60
<b>total</b>		<b>% 100</b>
PERCENTAGE OF SEMESTER WORK		% 40
PERCENTAGE OF FINAL WORK		% 60
<b>total</b>		<b>% 100</b>

## Workload and ECTS Credit Calculation

Activities	Number of Activities	Preparation for the Activity	Spent for the Activity Itself	Completing the Activity Requirements	Workload
Course Hours	14	0	3		42
Homework Assignments	1	20	1		21
Midterms	1	30	1		31
Final	1	30	1		31
<b>Total Workload</b>					<b>125</b>